

## **Microstructure formation in the interdiffusion zone of lead-free solder - substrate under thermomechanical load**

**thermodynamic stability, diffusion, precipitation, growth, mechanical behaviour, intermetallics**

- **Proposers:** S. G. Fries from SGF Scientific Consultancy, Aachen, Germany and I. Steinbach from RWTH-Aachen, ACCESS e. V., Germany
- **Participants:** call is opened for cooperation
- **Solders:** Sn-base
- **Substrate:** Ni or Cu
- **Techniques:** CALPHAD coupled to First-Principles, Phase-field, Finite-Elements
- **Validation:** experimental characterization of the interfacial microstructure under given constraint by SEM-EMPA-EDS-WDS, etc

**The interface solder-substrate with the subsequent formation of intermetallic compounds will be studied using the most powerful microstructure simulation available tool: phase field coupled to CALPHAD and first-principles calculations. That conjunction of techniques provides ways to understand and control the dynamic processes governing the growth of intermetallic phases in the interface. The simulation will use data available in the literature to predict microstructure formation which must be validated by specially designed experiments. Finite elements shall be used to study crack initiation.**

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- [4] I. Steinbach and M. Apel, *Physica D* 217 153 (2006)
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